Scolopendra morsitans Linnaeus, 1758: a Characteristic Prey of the African Carpet Viper *Echis ocellatus* Stemmler, 1970

Pascal REVAULT

ORSTOM BP 182 Ouagadougou 01, Burkina Faso

ABSTRACT

This short paper deals with the relationships between *Echis ocellatus*, the African Carpet Viper, which contributes largely to human envenomation, and its chilopodan prey, *Scolopendra morsitans*.

RÉSUMÉ

***Scolopendra morsitans* Linné, 1758 : une proie caractéristique de la vipère africaine *Echis ocellatus* Stemmler, 1970.**

En zone soudano-sahélienne, les vipéridés du genre *Echis* sont responsables d'une grande partie des envenimations humaines (HABIB, 1992). La prédation jouant un rôle majeur dans la dynamique et l'organisation des peuplements de reptiles tropicaux (BARBAULT, 1991), il est intéressant de connaître leur régime alimentaire. 47 *Echis ocellatus* ont été récoltés, dont 37 en octobre 1992 et 8 en avril 1993, dans quatre localités situées autour de Ouagadougou (Burkina Faso) ; fixés dans du formol à 10%, ils ont été disséqués et conservés dans de l'alcool à 60°. 8 individus avaient un tube digestif vide. Chez les 39 autres, on trouva 34 scolopendres du genre *Scolopendra* (dont 9 *S. morsitans*) et 16 rongeurs (dont 3 *Nannomys* sp.). 19 vipères contenaient des scolopendres, contre 12 qui avaient consommé des rongeurs ; seules 3 d'entre elles avaient consommé l'un et l'autre. Par ailleurs, furent trouvés dans les contenus intestinaux trois restes d'ophidiens (dont un *Psammophis*), un crapaud (*Bufo* sp.), une araignée, un scarabée, trois fourmis, trois arthropodes non identifiés et deux folioles de tamarinier (*Tamarindus indica*). Il n'y avait pas de corrélation entre la taille (ou le sexe) des *Echis* (35 cm en moyenne) et le type de proie. La prédation des rongeurs par les vipéridés est bien connue (VILLIERS, 1975). Elle favorise la présence de ces ophidiens aux abords des maisons et dans les champs. La consommation de reptiles, de batraciens et d'insectes est également bien établie. En revanche, l'importance de la capture de scolopendres était jusqu'ici, à notre connaissance, complètement ignorée, même si VILLIERS signale la prédation de myriapodes par des reptiles fouisseurs des genres *Typhlops* et *Leptotyphlops* et que WARRELL & ARNETT (1976) décrivent une consommation occasionnelle de myriapodes par *Echis*. La capture de *S. morsitans*, lucifuge et hygrophile, commune dans les concessions, pourrait expliquer la fréquence des rencontres homme/serpent la nuit, au crépuscule et à l'aube, dans et autour des habitations, principalement au début et à la fin de la saison des pluies. Le venin du genre *Echis* est essentiellement hémorragipare, très efficace pour la prédation des petits rongeurs. On peut se demander alors dans quelles conditions s'est développée, de manière aussi importante, la prédation des scolopendres. La description récente d'une glande supralabiale à débouché externe dans le genre *Echis* (INEICH & TELLIER, 1992), cas unique chez les serpents, apporte peut-être des éléments de réponse. Le développement de cette étude, sur plusieurs cycles pluviométriques, dans d'autres régions d'Afrique soudano-sahélienne (Nigeria notamment), chez d'autres espèces du genre *Echis*, serait riche d'enseignements pour la compréhension du fonctionnement de la biocénose et des interactions entre l'homme et son milieu.

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INTRODUCTION

In the Sudan and the Sahel Savannah, the genus *Echis* (Reptilia, Viperidae) contributes largely to bites of human and serious envenomations (HABIB, 1992; HUGHES, 1976; ROMAN, 1980). In the Ouagadougou area (Burkina Faso, Fig. 1), snake bites occur during the rainy season (Fig. 2), mostly during the night (including dusk and dawn), sometimes in houses, and principally at the beginning and the end of the season. Therefore it seems necessary to look for the factors that determine the encounter between man and snake.

The rainfall pattern and the predation pressure play a leading role in the dynamics and organization of tropical herpetofaunas (BARBAULT, 1991). We were curious to know more about the diet of *Echis ocellatus* in Burkina Faso.

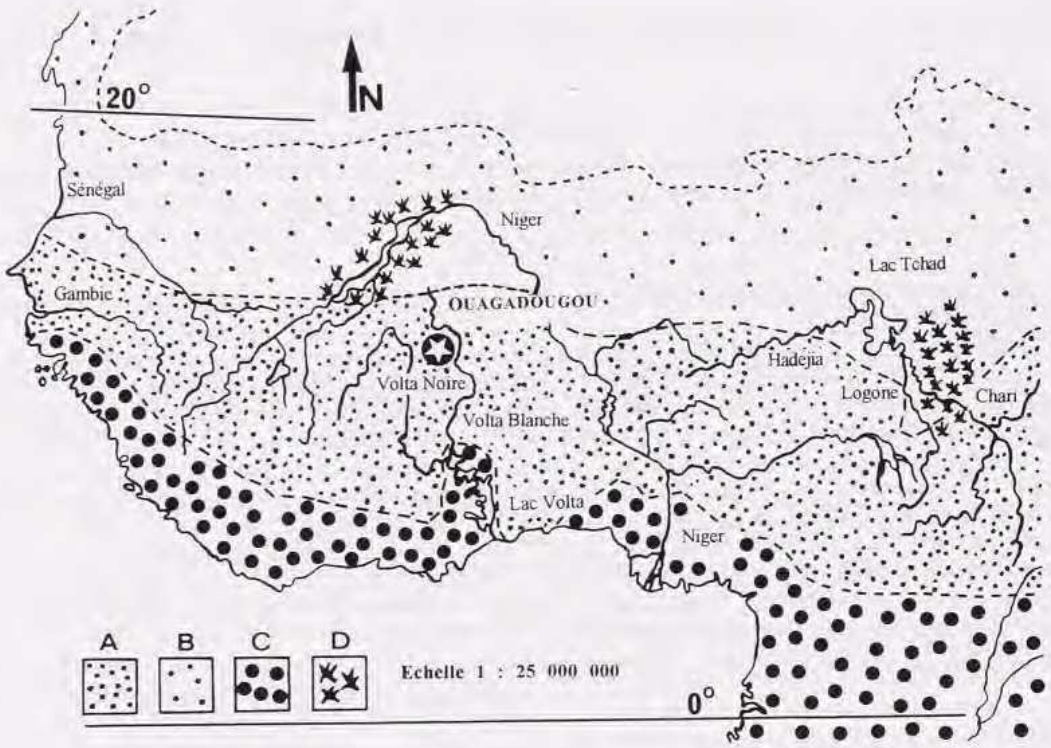

FIG. 1. — Study area in the Sudan Savannah: Ouagadougou (Burkina Faso). A: Sudan savannah, B: Sahelian steppe, C: Tropical forest, D: Marsh areas; according to LACOSTE (1990).

MATERIAL AND METHODS

In October (end of the rainy season) and in April (beginning of the rainy season), a snake collection was carried out, corresponding to the first and last bite peak (Fig. 2).

Echis ocellatus are crepuscular vipers, living especially in the Sudan Savannah (Fig. 1). Peasants captured the vipers from an area 100 km around Ouagadougou as they encountered them. The snakes were preserved in 10% formalin solution, after an injection with formalin (anus, tail). They were dissected in the 15 days after capture. The size, the sex were noted and the digestive content analysed (from the cardia to the anus). The animals were preserved in 60° alcohol (Laboratoire des Reptiles et Amphibiens MNHN, Paris, n° 3110-3117).

RESULTS

47 *Echis ocellatus* were captured (39 in October in three localities: Gonsé, Saponé and

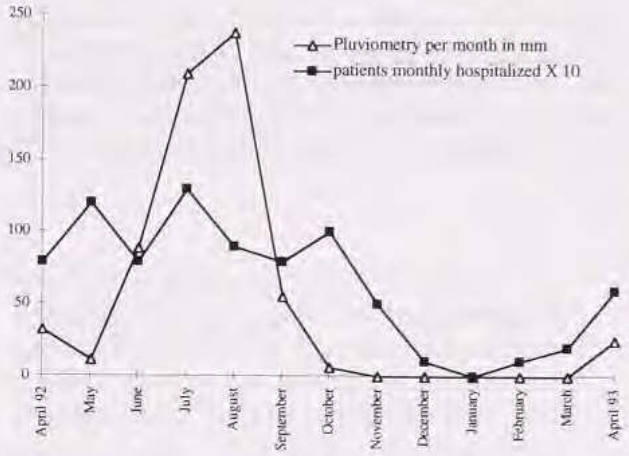

FIG. 2. — Correlation between snake bites and rainfall: number of patients monthly hospitalized at the H. N. of Ouagadougou (n = 83) during one year / Rain fall (665.5 mm in one year) from "Direction de la Météorologie".

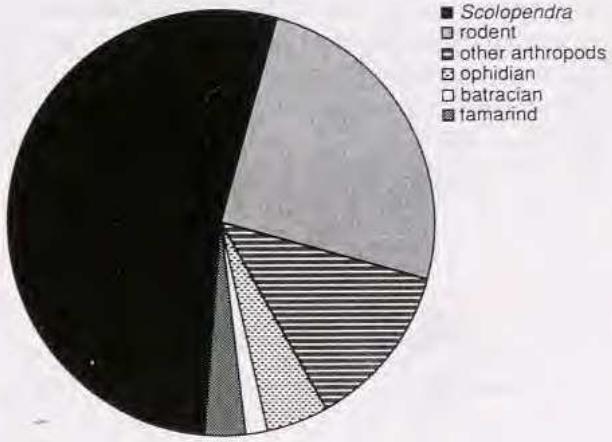

FIG. 3. — Digestive contents of 39 *Echis ocellatus*: taxonomic distribution of the 64 prey-types identified in the gut after dissection. Tamarind = tamarind leaflets).

Sapogo, and 8 in April in one locality: Kouloulou). The average length of 41 individuals, was 35 cm (2 individuals were 18 and 21 cm, the others were longer than 30 cm). The sex-ratio was $\neq 1$. Five animals had non mature eggs (2 in April and 3 in October).

There was no difference of size (or sex) between the vipers with no digestive content and the others. Equally, there was no correlation between the type of prey and the size (or the sex) of the *Echis*.

8 *Echis* had no gut contents. The gastro-intestinal contents of the 39 others are presented in Figure 3. 34 centipedes, genus *Scolopendra*, were found. 9 were *S. morsitans* (J.-M. DEMANGE *det.*). The average size, amongst 15 individuals, was 8 cm (from 5 to 12 cm). 21 snakes were concerned.

16 rodents were found. 3 belonging to the genus *Nannomys* (M. TRANIER *det.*). The average size, found in 6 individuals, was 8 cm (from 6 to 12 cm). 15 snakes were concerned.

In three cases only, the snake had swallowed a rodent and a *Scolopendra*.

The other prey were: 3 snakes (1 *Psammophis* sp.), 2 tamarind leaflets, 1 Solifugae, 1 Coleoptera, 3 ants and the rest non identifiable arthropods.

Scolopendra is a common prey of vipers (Fig. 4) but does not appear to be inportant in rice fields at Saponé in comparison with the other areas (Sudan Savannah).

DISCUSSION

The centipede *Scolopendra morsitans* is lucifugal and requires moisture. Snakes may enter houses at night, dusk and dawn, looking for centipedes and this may explain the frequency of man-snake encounters.

This study encompassed only one rainy season. Further data are required on the age, predators and reproduction of *Echis ocellatus*.

BARBAULT (1991) doesn't describe such a characteristic diet for *Echis ocellatus*, in the Sudan Savanah (Ivory-Coast) even if WARRELL & ARNETT (1976) describe that *Echis* sp. in Nigeria occasionnally swallow Myriapoda. In the same region, VILLIERS (1975) cites the

predation of Myriapoda by the genus *Typhlops* and *Leptotyphlops*, both burrowing snakes. In South Africa, Colubridae from the genus *Asparallactus* (BROADLEY & COK, 1993) are called centipede eaters, described as having an effective venom, making their prey helpless. But to our knowledge, the selective predation on centipedes amongst Viperidae, and especially on *Scolopendra*, has not been remarked up to now. The venom of *Echis* is essentially haemorrhagiparous, very effective for the predation of small rodents but not for centipedes. It can be asked under what type of conditions did the predation of centipedes develop in such a characteristic way. Is this particular diet found uniquely in the area of Ouagadougou, amongst the genus *Echis*? It is possible that the supra labial gland described by INEICH & TELLIER (1992) may be important in this respect.

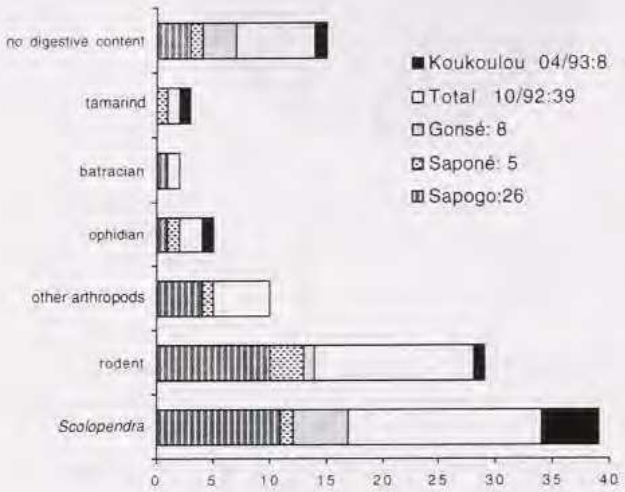

FIG. 4. — Relative importance of prey-types captured by 47 *Echis ocellatus* in 4 snake sampling sites.

LEWIS (1970) has pointed out that *Scolopendra morsitans* is atypical, amongst the scolopendromorph centipedes that have been studied, because it seems to be surface active throughout the year. The life cycle is completed in one year and young individuals appear in March and *again* in October (LEWIS, 1974).

In order to develop this study in the future, observations are required on several seasonal cycles and in other regions of Sudan and Sahel savanna. Other species of Echis should be investigated in order to enrich the comprehension of the biocenosis and the interaction between man and his environment.

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